

# **DRAFT Listing Methodology for Determining Water Quality Impairments from Aquatic Invasive Species**

## **GUIDANCE**

Draft

June 28, 2016<sub>(Ver. 1.0)</sub>



Alaska Department of Environmental Conservation  
Division of Water

## Contents

1	Purpose and Background .....	1
1.1	Parameter-Specific Regulations and Criteria .....	2
1.2	Aquatic Invasive Species in Alaska .....	3
2	Approach for Determining Attainment or Impairment .....	3
2.1	Impairment Evaluation.....	4
2.2	Designated Use Evaluation.....	6
2.3	Additional Factors.....	6
2.3.1	Recommendation .....	7
2.3.1.1	4c Impaired.....	7
2.3.1.2	4c Threatened.....	7
2.3.1.3	No Listing.....	7
3	Removal of a Waterbody from Category 4c for Aquatic Invasive Species .....	7

## Tables and Figures

Table 1. Designated Uses.....	2
Figure 1. AIS 4c evaluation flow chart .....	4
Table 2. Examples of impacts to Designated Uses.....	5

## Acronyms

AAC	Alaska Administrative Code
AIS	Aquatic Invasive Species
CWA	Clean Water Act
DEC	Alaska Department of Environmental Conservation
DF&G	Alaska Department of Fish and Game
DNR	Alaska Department of Natural Resources
EPA	U.S. Environmental Protection Agency
WQS	Water Quality Standards

## Definitions

Aquatic Invasive Species (AIS): a species that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

Designated Use: protected water use classes and subclasses that are protected by water quality criteria (18 AAC 70.020). Designated uses are the human and ecological uses of a waterbody that are recognized and protected. For example, water may be used as a drinking water supply, for recreation, or for the growth and propagation of fish, shellfish, other aquatic life and wildlife.

Infested Waterbody: A waterbody that has an established (recruiting or reproducing population of AIS.

Total Maximum Daily Load (TMDL): A TMDL is a waterbody restoration plan. A TMDL identifies the amount of a pollutant that a waterbody can assimilate and maintain compliance with water quality standards. TMDLs include an appropriate margin of safety and identify the level of management needed to reduce pollutant inputs to a level (or “load”) that allows a waterbody to meet its designated uses.

## 1 Purpose and Background

This document serves as guidance for listing waterbodies that are impaired for one or more designated uses due to aquatic invasive species (AIS) in Category 4c of the Integrated Report. Generally, waterbodies are assigned to categories by the degree to which water quality goals are attained. The five categories and three subcategories are described below:

- Category 1. All Water Quality Standards (WQS) criteria are attained.
- Category 2. Some WQS criteria are attained, but data and information to determine whether the WQS for the remaining uses are attained are insufficient or absent.
- Category 3. Data or information is insufficient to determine whether the WQS for any designated uses are attained.
- Category 4. The waterbody is determined to be impaired but does not need a total maximum daily load (TMDL).
  - Category 4a. An established and EPA-approved TMDL exists for the impaired water.
  - Category 4b. Requirements from other pollution controls have been identified to meet WQS for the impaired water.
  - Category 4c. Failure to meet a water quality standard for the impaired water is not caused by a pollutant; instead, the impairment is caused by a source of pollution such as nuisance aquatic plants, degraded habitat, or a dam that affects flow.
- Category 5. WQS are not attained for one or more criteria and the waterbody requires a TMDL or recovery plan. Category 5 waters are those waters identified on the Section 303(d) list of impaired waters.

Category 4c is used to categorize waters with impairments when the impairment source is not a pollutant. The Category 4c differs from Category 5 (impaired by a pollutant) in that it does not require the state to develop a total maximum daily load (TMDL) for waters identified as impaired. Category 4c is similar to Category 5 in that both fresh and marine waters can be affected.

Aquatic invasive species (AIS), exposures have increased from Alaska water over the past five years. In Presidential Executive Order 13112 (signed in 1992), invasive species are defined as “alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.” The National Invasive Species Council refined the definition in 2006 in their National Invasive Species Management Plan, “a species that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.” One example of a significant infestation is the aquatic invasive plant *Elodea* spp. detected in the Chena Slough in fall of 2010. Concerned citizens of Fairbanks invited area legislators and state agency commissioners to visit the slough to observe the infestation in 2012 with hopes it would encourage agencies to engage on the issue. One outcome of that meeting was a Memorandum of Understanding (MOU) signed by the commissioners of the Departments of Environmental Conservation (DEC), Fish and Game (DF&G), and Natural Resources (DNR) in which they agreed to coordinate interagency AIS efforts.

Since the MOU was signed in 2013, staff from these departments have collaborated on various levels to address aquatic invasive species. Several waterbodies impacted by AIS have been identified and staff are working to manage priority species. For example, in January of 2014, *Elodea* spp. was quarantined by DNR along with three other potentially invasive aquatic plant species: *Egeria densa*, *Hydrilla verticillata*, and *Myriophyllum spicatum*, in hopes of preventing new invasive plants from entering the State and the spread of Elodea. *Elodea* spp. eradication efforts in Kenai were initiated in 2014, and in Anchorage in the summer of 2015.

According to statute (AS 16.35.210), it is illegal to transport, import, or export nonindigenous fish to state waters unless permitted. In 2011, DF&G received funds for a four year project to remove pike from the Alexander Creek drainage with the goal of increasing Pacific salmon populations in the basin. As a preliminary result of this management, increased numbers of Chinook have been observed in the system.

## 1.1 Parameter-Specific Regulations and Criteria

Alaska has a narrative water quality criteria for AIS listing in the standards for toxic and other deleterious organic and inorganic substances under 18 AAC 70.020(b)(11) and (23). The narrative criteria states:

“There may be no concentrations of toxic substances in water or in shoreline or bottom sediments, that, singly or in combination, cause, or reasonably can be expected to cause, adverse effects on aquatic life or **produce undesirable or nuisance aquatic life**, except as authorized by this chapter. (Emphasis added)”

This narrative criteria applies to both the introduction or presence of AIS and the discharge of substances such as nutrients that may worsen AIS conditions.

Category 4c is an impairment status designation for the waterbodies that are impaired for one or more designated uses (e.g. water supply, recreation or growth and propagation of fish, shellfish, other aquatic life and wildlife) as a result of conditions other than the discharge of a pollutant, such as AIS presence. Designated uses are defined in 18 AAC 70.020 and are summarized in Table 1.

Table 1. Designated uses

Designated uses
1. Fresh water
a. Water supply
i. Drinking, culinary and food processing
ii. Agriculture, including irrigation and stock watering
iii. Aquaculture
iv. Industrial
b. Water recreation
i. Contact recreation
ii. Secondary recreation

- c. Growth and Propagation of Fish, Shellfish, Other Aquatic Life and Wildlife
- 2. Marine water
  - a. Water supply
    - i. Drinking, culinary and food processing
    - ii. Agriculture, including irrigation and stock watering
    - iii. Aquaculture
    - iv. Industrial
  - b. Water recreation
    - i. Contact recreation
    - ii. Secondary recreation
  - c. Growth and Propagation of Fish, Shellfish, Other Aquatic Life and Wildlife
  - d. Harvesting for consumption of raw mollusks or other raw aquatic life

## 1.2 Aquatic Invasive Species in Alaska

The AIS causing the Category 4c water quality impairment must be recognized by DNR and/or DF&G as a priority species for Alaska. DNR and DF&G provide guidance on non-native species of concern via the Alaska Aquatic Nuisance Species Management Plan<sup>1</sup>, the Prohibited and Restricted Noxious Plants List (in statute)<sup>2</sup>, or the Strategic Plan for Invasive Weed & Agricultural Pest Management and Prevention in Alaska<sup>3</sup>. These AIS lists are generated from species or vector risk assessments, observation of impacts by AIS to habitats in the region; or are based on the widespread distribution of a nonnative species among varied environmental regimes as an indication of a species potential invasibility. Other resources may be used for further evidence of potential impairment such as federal lists of invasive species relevant to Alaska, or the University of Alaska Anchorage's Alaska Exotic Plants Information Clearinghouse (AKEPIC)<sup>4</sup>.

## 2 Approach for Determining Attainment or Impairment

The minimum requirement for listing a waterbody as Category 4c impaired is the documentation and confirmed identification of an established population of an AIS. DEC will take the lead on listing, with concurrence from DNR for plants or DF&G for fish. Additional evaluation of the AIS infestation, including delineating populations, potential impacts to fisheries/habitats, and non-pollutant impairments will occur prior to recommending listing a waterbody as impaired by AIS in Category 4c. The flow chart shows the process by which staff will evaluate waters to determine whether or not to recommend a water as impaired in Category 4c (Figure 1). Not all documented instances of AIS will result in a water being proposed as impaired. A waterbody will only be

---

<sup>1</sup> [http://www.anstaskforce.gov/State%20Plans/ak\\_ansmp.pdf](http://www.anstaskforce.gov/State%20Plans/ak_ansmp.pdf)

<sup>2</sup> 11 AAC 34.020

<sup>3</sup> [http://plants.alaska.gov/invasives/pdf/Strategic\\_Plan\\_for\\_Invasive\\_Weed\\_Management\\_Alaska.pdf](http://plants.alaska.gov/invasives/pdf/Strategic_Plan_for_Invasive_Weed_Management_Alaska.pdf)

<sup>4</sup> <http://aknhp.uaa.alaska.edu/botany/akepic/>

considered impaired in Category 4c if there are persistent impacts to one or more designated uses (18 AAC 70.020) from AIS.

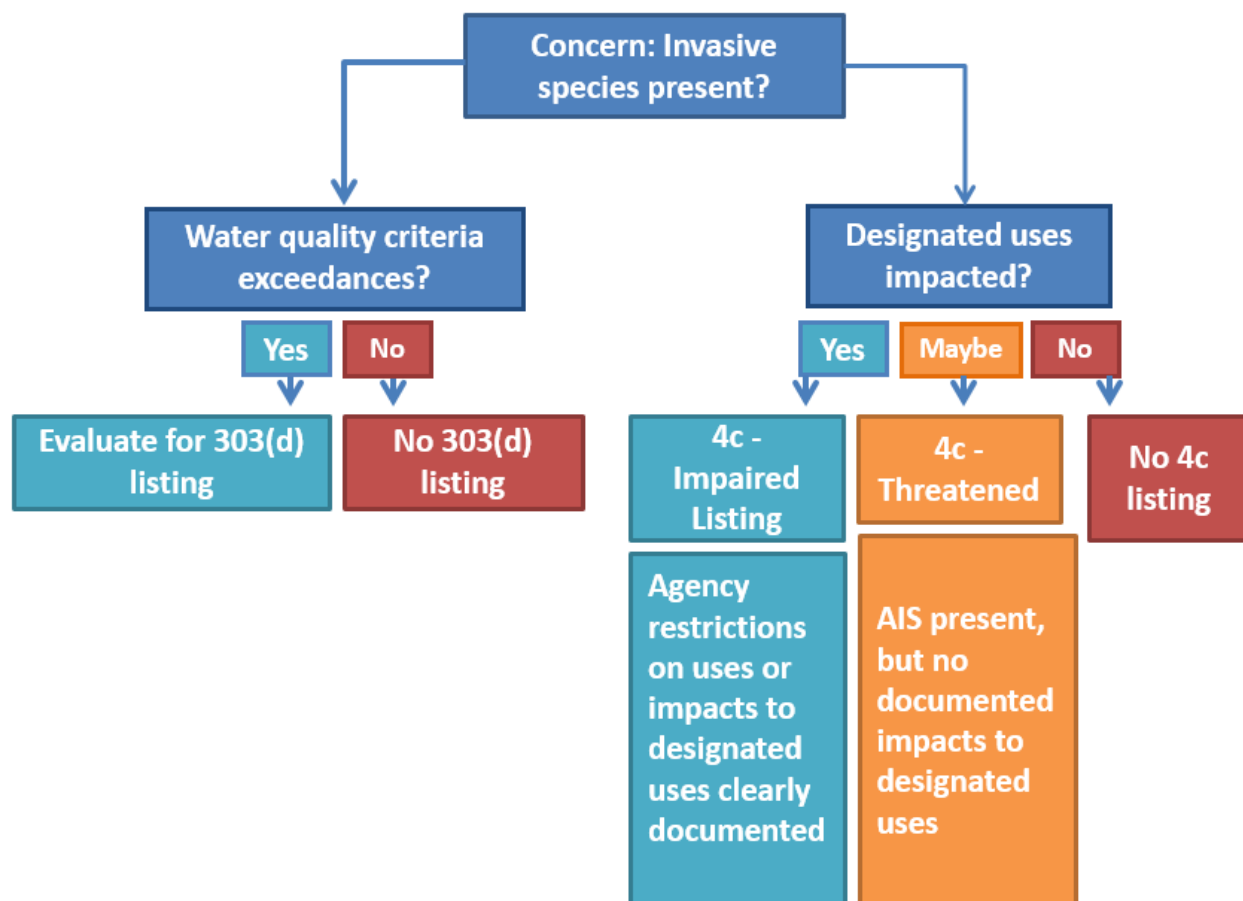


Figure 1. AIS 4c evaluation flow chart

## 2.1 Impairment Evaluation

A waterbody will be evaluated for impairment for water quality criteria exceedances and designated use impacts from AIS. If there is a pollutant parameter associated with the impairment that is not meeting criteria, there may be an additional water quality evaluation to determine if the waterbody will receive a listing recommendation for Category 5 (303(d) listing) for the pollutant parameter. A water quality evaluation is not required for an evaluation of impacts to designated uses. The evaluation for Category 4c will focus on impacts from AIS to designated uses (Table 2).

Table 2. Examples of impacts to designated uses

Designated uses (18 AAC 70.020)	Examples of impacts to designated uses
(A) Water Supply (i) drinking, culinary, and food processing	May not have detrimental effects on water supply. Examples include clogging of intake pipes due to excessive vegetation or changes in chemistry. For instance, excess vegetation can change the chemistry of water supply, such as pH or dissolved gas, so that the water is no longer ideal for human consumption.
(A) Water Supply (ii) agriculture, including irrigation and stock watering	May not cause detrimental effects on established water supply uses. For example, soil erosion and fertilizer runoff (including livestock waste) are the two major agricultural facilitators of aquatic invasive plants and/or nuisance vegetation in irrigation ponds. Eroded soil particles not only make the pond shallower and allow rooted weeds to invade quickly, but also transport fertilizer that further stimulate weed growth.
(A) Water Supply (iii) aquaculture	May not cause detrimental effects on aquaculture activities.
(A) Water Supply (iv) industrial	May not cause detrimental effects on established water supply uses such as colonies of AIS, such as dreissenid mussels, that become so dense that the water flow through industrial pipes is restricted which can be problematic throughout the infrastructure and expensive to mitigate.
(B) Water Recreation (i) contact recreation	May not have detrimental effects on water recreation such as AIS presence resulting in beach or shoreline access restrictions or leading to increased sediment, alteration in flow or hydraulic conditions, reduction in native species or other effects. Many invasive species cause alterations in trophic levels that can reduce native species by eliminating or reduce available food sources. For example, dreissenid mussels withdraw large quantities of plankton from the water column, thus competing with planktivorous fish and other filter feeders.
(B) Water Recreation (ii) secondary recreation	May not have detrimental effects on water recreation resulting from AIS presence. Examples include not being able to canoe through an infested area due to overgrowth of AIS, increased sediment, alteration in flow or hydraulic conditions, reduction in native species; reduced fishing opportunity due to AIS overgrowth in the channel or fishing lines getting tangled in nonnative vegetation; loss in fishing opportunity for native species due to predation by AIS.
(C) Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife	May not have detrimental impacts to fisheries such as changes in biodiversity and reduction in native species; change in fishing season; bag limit; methods and means as a result of AIS presence.

## 2.2 Designated Use Evaluation

Alaska's Water Quality Standards (WQS) include three components: water quality criteria, antidegradation policy and designated uses (18 AAC 70). Designated uses are the human and ecological uses of a waterbody that are recognized and protected. For example, water may be used as a drinking water supply, for recreation, or for the growth and propagation of fish, shellfish, other aquatic life and wildlife. WQS represent the goals the public has agreed should be attained in a waterbody. Fresh and marine water designated uses and subclasses are listed in 18 AAC 70.020 (Table 1).

Recent available information will be evaluated to determine if there are impacts from AIS to any of the designated uses. Impacts from AIS to any one of the uses is sufficient for consideration. Sources of information may include documented agency restrictions, observations, reports, or assessments.

## 2.3 Additional Factors

In determining a listing, one should evaluate the following factors using species specific criteria and evaluate for applicability:

- Area of coverage
- Connectivity to sensitive or highly productive systems
- Invasiveness ranking
- Presence of a water reserve on the system
- Ease of transmittal and dispersal of AIS to other areas and /propagative methods
- Is the habitat suitable for establishment
- Impacts documented in neighboring regions where it is not native
- Ability and time it takes to naturalize
- Competitiveness to native systems
- Endangered, threatened or other listed species present in the system
- Multiple AIS in the system
- Anadromous, wild or resident fish present in the system
- Has the AIS resulted in economic impacts in AK

Less objective:

- Native cultural activities are threatened by the invasive species present
- Commercially important species are threatened
- Aesthetic value impacts, noise, visual, smells

### 2.3.1 Recommendation

Based on the evaluation of impacts to designated uses, the waterbody will be recommended for 4c Impaired, 4c Threatened, or no listing.

#### 2.3.1.1 *4c Impaired*

A waterbody will be considered 4c Impaired if there are clear documented impacts to designated uses associated with the AIS. Impacts to designated uses may include agency restrictions to prevent the spread of AIS. Some examples of a documented impact to a designated use as a result of AIS include:

- Restriction on water withdrawals to prevent spread of AIS.
- Loss of recreational opportunity (i.e. fishing, swimming, boating from AIS impacts, for example Elodea too thick to canoe through).
- Restriction on float plane/boater access to a waterbody to prevent spread of AIS and for pilot safety.
- Closure of a fishery due to AIS impacts on native populations.
- Listing a native species as threatened or endangered.
- Economic impacts as a result of impacts from AIS to any designated use (i.e. reduced property values).

#### 2.3.1.2 *4c Threatened*

A waterbody will be considered 4c Threatened if there is an AIS present but there are not clear documented impacts to the designated uses in Alaska's WQS.

The 4c Threatened category allows ADEC the option to list a waterbody as Category 4c Threatened without full documentation of impacts to designated uses.

#### 2.3.1.3 *No Listing*

If there are no impacts to designated uses and no public concern over the presence of an AIS, the waterbody will not be recommended for listing.

## 3 Removal of a Waterbody from Category 4c for Aquatic Invasive Species

A waterbody may be recommended for removal from Category 4c when it is documented that the impacts to designated uses no longer exist. For example, an AIS may be eradicated or controlled to an extent that no designated uses are impacted. The documentation must show that the waterbody meets the designated use over a period of at least five years.